

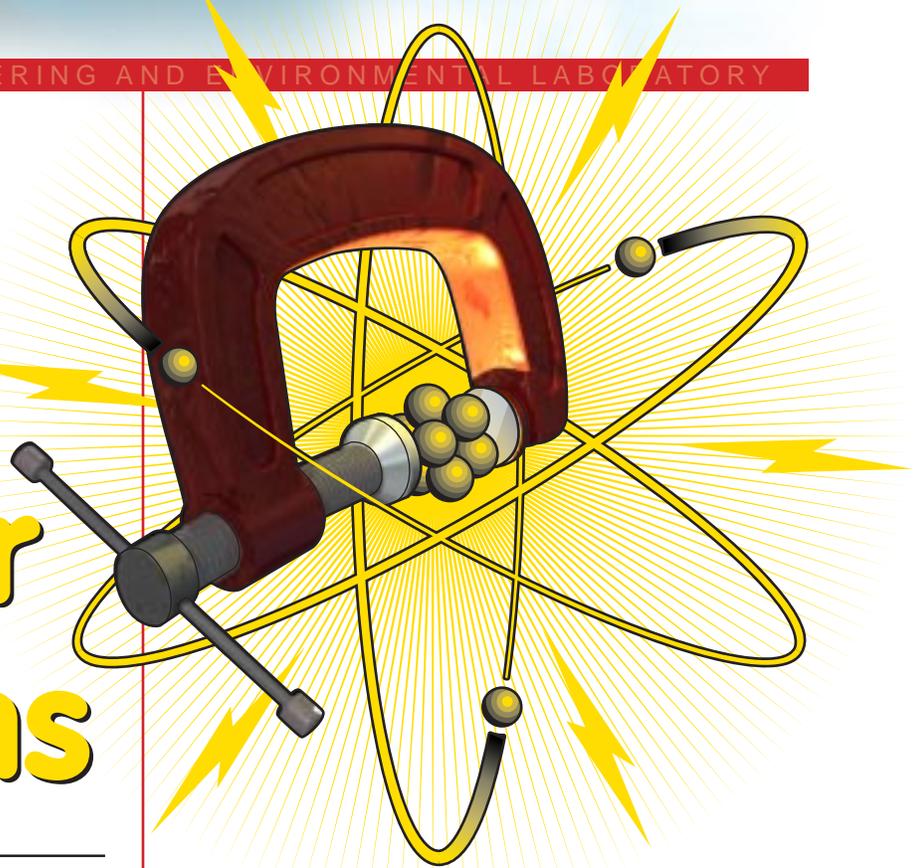


Imagine

Exploring **Science**
and **Engineering** with the INEEL

IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY

Squeezing Big Power from Tiny Atoms



Idaho scientists find atomic answers

If a storm has ever knocked out the power in your house, you understand what the world would be like without electricity.

To help make sure that we always have enough, Kathy McCarthy directs a team at the INEEL that explores new ways to make electricity. One way is to use the energy stored up inside atoms.

Everything you see and feel is made up of atoms: from your desk to your skin

to the dirt outside. Atoms are even floating through the air around you.

There are more than 100 different types of **atoms**, but they all have one thing in common: all atoms consist of a center, or **nucleus**, surrounded by a cloud of tiny particles called **electrons**.

See **ATOMS**, page 3

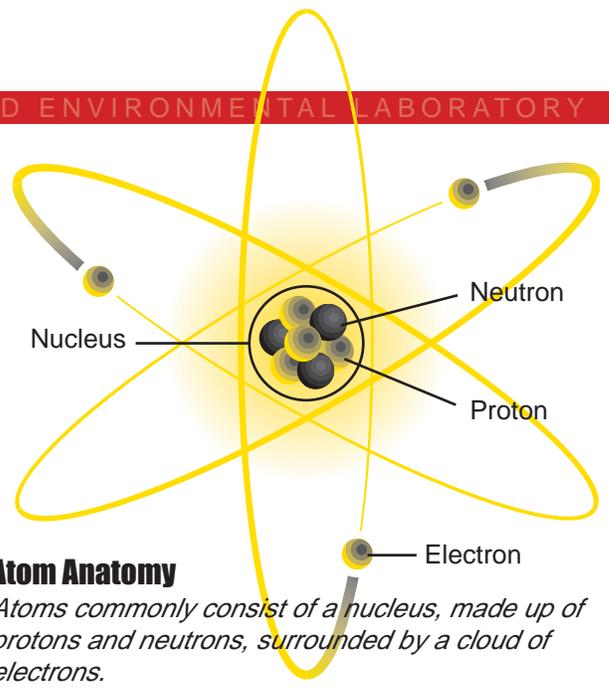
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Key Definitions

- a) INEEL** – Short for the Idaho National Engineering and Environmental Laboratory. It is a place where scientists think of new ideas and engineers build things to make our lives better. One way they try to improve things is by coming up with better ways to make energy and electricity.
- b) Atoms** – The individual units that make up the world's basic ingredients, called **elements**. Some familiar elements are oxygen, helium, iron, gold, and carbon. Many types of elements, including carbon, have a certain number of naturally unstable atoms that can release energy.
- c) Nuclear Energy** – energy stored up inside an atom, which can be released from an unstable nucleus in the form of heat and radiation. Nuclear energy provides one fifth of the country's electricity.
- d) Nuclear Science & Engineering** – a team at INEEL that comes up with new ways to harness the energy stored inside atoms and put that energy to use.

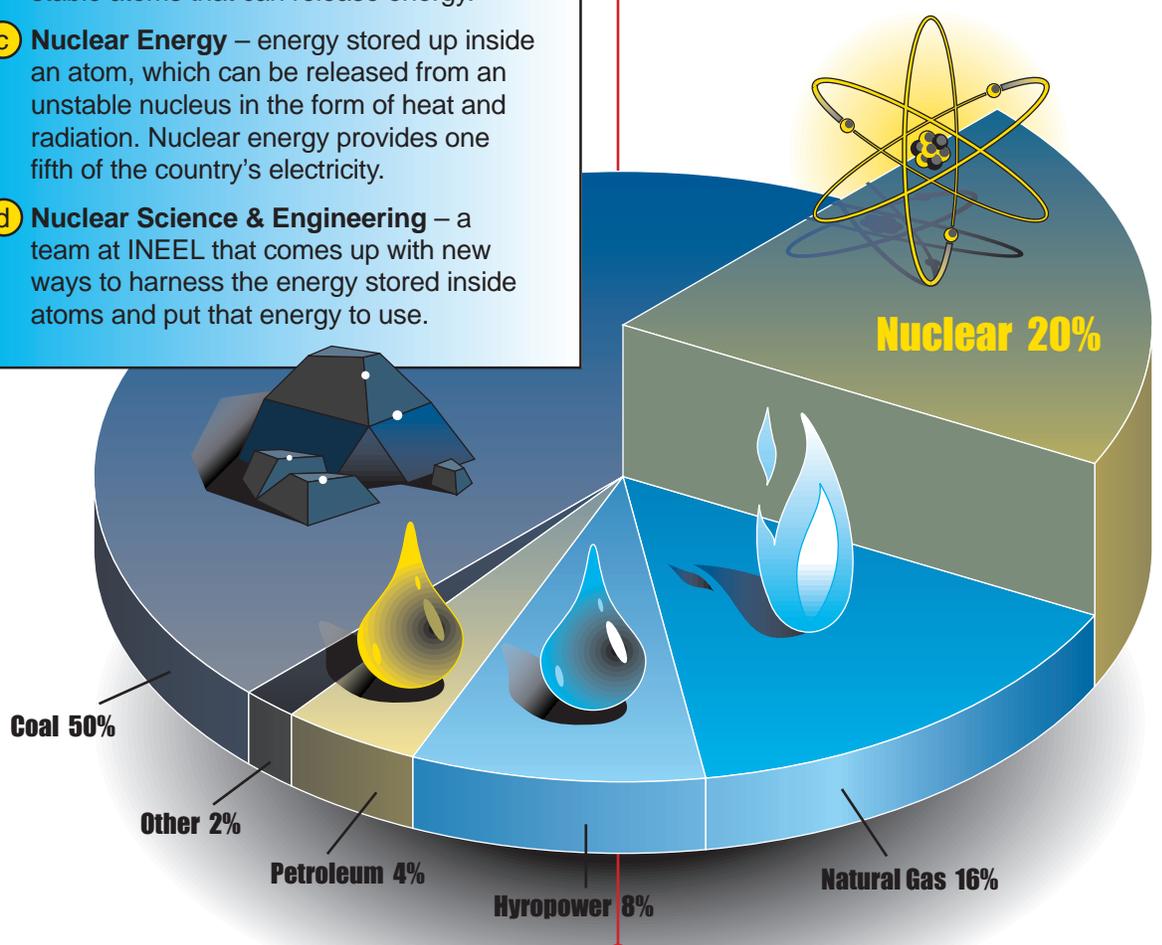


Atom Anatomy

Atoms commonly consist of a nucleus, made up of protons and neutrons, surrounded by a cloud of electrons.

Sources of Electrical Energy in the U.S.

The United States gets one fifth of its electricity from nuclear energy.



ATOMS, *continued from page 1*

Things related to the nucleus are called nuclear – so nuclear energy comes from the nucleus of an atom.

The nucleus is made up of two types of **particles: protons** and **neutrons**. Some atoms have a nucleus that is unstable, like a balloon that has too much air. An overfilled balloon will often pop, releasing energy in the form of sound.

**Microscopic Fact**

Doctors use radiation every day to look inside our bodies and to fight cancer.

Kathy McCarthy travels to regional schools to talk with students about nuclear energy.

In an unstable nucleus, the protons and neutrons split apart from each other naturally. The extra energy is released as heat and radiation. **Radiation** is made up of tiny, fast-moving particles and powerful waves of energy.

The heat that comes from unstable atoms can be used to make electricity. Radiation is used in medicine, food safety, and to figure out the age of old rocks and bones.

Kathy is the director of the Nuclear Science and Engineering team at the INEEL. This means that she is the boss of nearly 100 people who find new ways to harness nuclear energy and put it to good use.

**Microscopic Fact**

Radiation is used to destroy the germs that creep into food, spices and medical instruments.



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STORY QUIZ!

Squeezing Power from Atoms

(fill in the blank)

- i) The nucleus of an atom is made up of these two particles:

- ii) The nucleus of an atom is surrounded by a cloud of:

- iii) Kathy McCarthy directs this team at the INEEL:

- iv) Radiation is used in:

- v) Radiation is used to figure out:
_____.

WORD SCRAMBLE:

Use information from the story as clues to help you unscramble these words.

- | | |
|-----------|---------|
| TOMA | CRANEUL |
| RATIONIDA | ONTURNE |
| TRONOP | |

MATCHING!

Find these words in the story and match to definitions listed.

- a. Nucleus – tiny, fast-moving particles and powerful waves of energy released from an unstable atom.
- b. Protons and Neutrons – the world's basic ingredients.
- c. Radiation – the center of something, usually an atom.
- d. Elements – particles making up the center of an atom.

VOCABULARY!

Find each of these words in the story and facts. What do they mean?

- a. Atom _____
- b. Particle _____
- c. Electron _____

Microscopic Fact



The word "atom," is Greek for indivisible, because scientists used to think atoms were the smallest particle that existed.



IMAGINE is a science and engineering quarterly for school kids published by the Idaho National Engineering and Environmental Laboratory. Imagine encourages students to see the world of possibilities in science and engineering by exploring exciting ideas, technologies and the people who create them. The INEEL is operated for the DOE by Bechtel BWXT Idaho, LLC. Requests for additional copies, story ideas or questions should be directed to the editor at (208) 526-1058, kzc@inel.gov. This is printed on recycled paper.

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